Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: 8/29/13 Period: \_\_\_\_\_\_ LAB

**Metric Practice Lab**

**Objective:** To practice measuring volume, mass, and density of objects using the metric system.

**Directions:** Measure the volume, mass, and density of the objects listed below. Record your measurements in the data table below.

* Length/Width/Height: use the metric side (cm) of the ruler
* Volume: LxWxH for regular shaped objects and water displacement method for irregular shaped objects.
  + Water displacement:
    1. Fill up the graduated cylinder with 30mL of water from the sink (remember, measure the water level at the center/bottom of the curve of the water).
    2. Record the water level in the table below (if it’s a little above or a little below 30mL, that’s fine, just record exactly what it is).
    3. Place object in graduated cylinder. Record the water level while the object is in the water.
    4. Subtract the water level after the object has been placed in from the water level before it was placed in.
* Mass: use the triple beam balance: start by moving the heavier weights first, then “fine tune” to the lighter ones.
* Density=mass ÷ volume

**Data Table:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Object** | **Volume** | **Mass** | **Density** |
| Science Textbook | L=\_\_\_\_\_\_\_  W= \_\_\_\_\_\_\_\_  H= \_\_\_\_\_\_\_\_  V= \_\_\_\_\_\_\_\_\_\_ | 2.8kg |  |
| Pencil | Water level before: \_\_\_\_\_\_\_  Water level after: \_\_\_\_\_\_\_\_  V= \_\_\_\_\_\_\_\_\_ |  |  |
| One block on wall | L=\_\_\_\_\_\_\_  W= \_\_\_\_\_\_\_\_  H= \_\_\_\_\_\_\_\_  V= \_\_\_\_\_\_\_\_\_\_ | 10kg |  |
| Penny | Water level before: \_\_\_\_\_\_\_  Water level after: \_\_\_\_\_\_\_\_  V= \_\_\_\_\_\_\_\_\_ |  |  |
| Shell | Water level before: \_\_\_\_\_\_\_  Water level after: \_\_\_\_\_\_\_\_  V= \_\_\_\_\_\_\_\_\_ |  |  |
| Block | L=\_\_\_\_\_\_\_  W= \_\_\_\_\_\_\_\_  H= \_\_\_\_\_\_\_\_  V= \_\_\_\_\_\_\_\_\_\_ |  |  |

**Practice Problems:**

1. Circle the unit that you think would be best to measure:
   1. The length of your eyelash: km m mm
   2. The length of a pencil: km m cm
   3. The mass of a cat: kg g mg
   4. The mass of an eraser: kg g mg
   5. The volume of water in a gallon: kL L mL
   6. The volume of a brick: L mL cm3

**Draw the King Henry Slider:**

**Complete the following conversions:**

|  |  |
| --- | --- |
| 1. 7.6 kg = \_\_\_\_\_\_\_\_\_\_\_ g 2. 0.85 m = \_\_\_\_\_\_\_\_\_\_\_ cm 3. 45 L = \_\_\_\_\_\_\_\_\_\_\_\_\_ mL 4. 35 mm = \_\_\_\_\_\_\_\_\_\_\_ m 5. 0.0045 L = \_\_\_\_\_\_\_\_\_\_ mL | 1. 0.084 km = \_\_\_\_\_\_\_\_\_\_ cm 2. 824 mg = \_\_\_\_\_\_\_\_\_\_\_ g 3. 0.42 cm = \_\_\_\_\_\_\_\_\_\_ mm 4. 65 mL = \_\_\_\_\_\_\_\_\_\_\_\_\_ L |

**Solve the following density problems:**

1. Find the Density:
   1. Mass = 2.9g, volume= 12mL Density= \_\_\_\_\_\_\_\_\_\_\_\_\_\_g/mL
   2. M= 9.6kg, V=1100cm3 D= \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ g/cm3

**(HINT: convert 9.6kg into g first by using the “King Henry slider”)**

1. You have a round sphere. You know the sphere is made out of Aluminum, which has a density of 2.45 g/mL. If you place your round sphere in a graduated cylinder that is filled up with 50mL of water, and the water level rises to 56mL, what is the mass of your aluminum sphere? SHOW SOME WORK.
2. **What is the density of a piece of iron that has a mass of 59.8g and a volume of 2.08 cm3? SHOW SOME WORK.**
3. **Corn oil has density of 6.89 g/cm3. What is the mass of the corn oil if the volume is 34.0 cm3? SHOW SOME WORK.**
4. **What is the density of mercury that has a mass of .0396 kg and a volume of 9.00 cm3? SHOW SOME WORK.**